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Substance Use Prevention for Urban American Indian Youth: An Efficacy Trial of the Culturally Adapted *Living in 2 Worlds* Program

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Abstract

This article describes a small efficacy trial of the *Living in 2 Worlds* (*L2W*) substance use prevention curriculum, a culturally adapted version of *keepin' it REAL* (*kiR*) redesigned for urban American Indian (AI) middle school students. Focused on strengthening resiliency and AI cultural engagement, *L2W* teaches drug resistance skills, decision making, and culturally grounded prevention messages. Using cluster random assignment, the research team randomized three urban middle schools with enrichment classes for AI students. AI teachers of these classes delivered the *L2W* curriculum in two schools; the remaining school implemented *kiR*, unadapted, and became the comparison group. AI students ($N=107$) completed a pretest questionnaire before they received the manualized curriculum lessons, and a posttest (85% completion) one month after the final lesson. We assessed the adapted *L2W* intervention, compared to *kiR*, with paired *t* tests, baseline adjusted general linear models, and effect size estimates (Cohen's *d*). Differences between the *L2W* and *kiR* groups reached statistically significant thresholds for four outcomes. Youth receiving *L2W*, compared to *kiR*, reported less growth in cigarette use from pretest to posttest, less frequent use of the Leave drug resistance strategy, and less loss of connections to AI spirituality and cultural traditions. For other substance use behaviors and antecedents, the direction of the non-significant effects in small sample tests was toward more positive outcomes in *L2W* and small to medium effect sizes. Results suggest that evidence-based substance use prevention programs that are culturally adapted for urban AI adolescents, like *L2W*, can be a foundation for prevention approaches to help delay initiation and slow increases in substance use. In addition to study limitations, we discuss implementation challenges in delivering school-based interventions for urban AI populations.

Keywords

cultural program adaptation; indigenous; adolescents; Native American; drugs; alcohol

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Conflicts of Interest

The authors have no financial interest in the interventions examined in this study and no conflicts of interest to disclose.

Introduction

Urban American Indian (UAI) communities contend disproportionately with health disparities related to substance use (Rutman, Park, Castor, Taulii, & Forquera, 2008). UAIs constitute a steadily growing majority of the American Indian (AI) population, of whom 71% live off reservation lands and in urban areas as of 2010 (US Census Bureau, 2010). AI youth often report higher prevalence, earlier onset, more severe consequences, and less perceived risk of harm from substance use than their non-Native counterparts (Beauvais, Jumper-Thurman, & Burnside, 2008; De Ravello, Everett Jones, Tulloch, Taylor, & Doshi, 2014; Lawrence, Pampel, & Mollborn, 2014; Moncher, Holden, & Trimble, 1997). For example, national survey data indicate that AI youth have a higher prevalence of alcohol or drug use than all other racial and ethnic groups (AI=47.5%; Hispanic=36.7%; White=39.2%; African American=32.2%; Asian/Pacific Islander=23.7%; Wu, Woody, Yang, Pan, & Blazer, 2011). Although their communities are quite diverse—differing by region, migration history and tribal backgrounds—UAIs face similar social and cultural stressors linked to substance use, including acculturation, urbanization, ethnic isolation, cultural disruptions, marginalization, invisibility, and discrimination (Hawkins, Cummins, & Marlatt, 2004; Walters, 1999). However, evidence-based prevention efforts have rarely addressed the distinctive needs of UAIs (Castor, Smyser, Taulii, Park, Lawson, & Forquera, 2006; National Urban Indian Family Coalition, 2008).

Connections to tribal cultures and communities provide resources for UAIs to sustain their Native identities and promote well-being (Clifford, 2007; Spicer, Novins, Mitchell, & Beals, 2003). Although empirical findings in this regard are not entirely consistent, there is accumulating evidence that AIs who identify positively with their Native heritage, maintain connections with extended family, and integrate traditional values into their lives are less vulnerable to risky behaviors, including substance use (Baldwin, Brown, Wayment, Nez, & Brelsford, 2011; Walters, Simoni, & Evans-Campbell, 2002; Whitbeck, Walls, & Hartshorn, 2014). Accordingly, behavioral interventions for AIs increasingly incorporate elements of cultural engagement (Gone, 2009; Native Vision Project, 2012; Walker, Bigelow, LePak, & Singer, 2012).

In this paper, we describe a small efficacy trial of a culturally adapted substance use prevention intervention, *Living in 2 Worlds (L2W)*, that was designed specifically for UAI middle-school youth. *L2W* addressed social factors shaping substance use among UAI youth and drew systematically on the potentially protective nature of connection to AI cultures.

Living in 2 Worlds

Living in 2 Worlds (L2W) is adapted from *keepin' it REAL (kiR)*, a universal school-based substance use prevention intervention that teaches youth a repertoire of skills to resist substance use offers, as well as risk assessments, decision-making, and other life skills (Gosin, Marsiglia, & Hecht, 2003). The original *kiR* curriculum teaches four commonly used drug resistance strategies: Refuse, Explain, Avoid, and Leave, which form the acronym REAL (Alberts, Miller-Rassulo, & Hecht, 1991). A longitudinal randomized controlled trial with over 6,000 middle school students demonstrated the efficacy of *kiR* in preventing substance use and strengthening anti-drug norms and attitudes (Hecht et al., 2003; Kulis,

Nieri, Yabiku, Stromwall, & Marsiglia, 2007; Kulis, Yabiku, Marsiglia, Nieri, & Crossman, 2007; Marsiglia, Kulis, Yabiku, Nieri, & Coleman, 2011). However, subgroup analyses showed that *kiR* was not effective in preventing alcohol and marijuana use among UAI youth, although it was effective among their non-Native counterparts (Dixon et al., 2007). Further evidence of the need for program adaptation came from qualitative studies showing that UAI youth use the REAL drug resistance strategies often but employ them in distinctive ways, for example by finding a respectful way to say “no” to an offer, or combining a direct refusal with an explanation. In addition to avoiding drug offer situations, they employ passive strategies to evade using substances while remaining present when offers occur, redirecting attention from the substance offer by changing the subject or using humor (Kulis & Brown, 2011; Kulis, Reeves, Dustman, & O’Neill, 2011). Such non-confrontational approaches allow UAI youth to remain in social situations and preserve relationships in family networks where many substance offers occur (Kulis, Okamoto, Rayle, & Sen, 2006; Okamoto, LeCroy, Dustman, Hohmann-Marriott, & Kulis, 2004; Rayle et al., 2006; Waller, Okamoto, Miles, & Hurdle, 2003).

We developed *L2W* through a community-based participatory research (CBPR) approach that employed expert knowledge of UAI youth, parents, professionals, and prevention curriculum specialists, who included the original designers of *kiR* (see Jumper-Reeves, Dustman, Harthun, Kulis, & Brown, 2014). The adaptation process followed a theoretical model of cultural adaptation (Castro, Barrera, & Martinez, 2004), modifying *kiR* with culturally appropriate language, content, images, scenarios, and formats for UAI youth. The adaptation maintained fidelity to core components of *kiR* such as drug resistance, decision-making, communication competence, and other life skills training. The *L2W* curriculum adaptation integrated three types of information: prior research on substance use risk and protective factors for UAI youth, culturally specific ways that UAI youth encounter and resist substance offers, and representations of AI cultural elements (Jumper-Reeves et al., 2014). For example, in one of the new curriculum lessons students develop a personal value for using storytelling as a resistance strategy, based on the importance of the oral tradition in AI culture in transmitting their heritage from one generation to another. This new lesson expands on the Explain strategy as another way that students can indicate why they choose not to engage in substance use and risky behaviors. Risk and protective factors for substance use among UAI youth develop from interconnected relationships with family, peers, schools, neighborhoods, reservations, and communities (Hurdle, Okamoto, & Miles, 2003). A commonly noted risk factor is the exposure of AI youth to permissive substance use attitudes and behaviors within the extended family (Hurdle et al., 2003; Kulis et al., 2006). Incorporating culture into identity can increase social support and enlist positive family and peer influences, protecting AI youth from engaging in risky behaviors (Baldwin et al., 2011). The scenarios in *L2W* address these factors specifically. In one lesson students brainstorm how to handle a situation where a cousin offers them beer at their grandmother’s house. To enhance protective factors, each lesson incorporated representations of UAI cultural values and ways for youth to draw upon their AI cultural backgrounds.

We pilot tested an initial version of the *L2W* curriculum with UAI youth at two middle schools, and an evaluation demonstrated positive effects in core components targeted by the original *kiR* program (Kulis, Dustman, Brown, & Martinez, 2013). After further refinements

we tested the final 12-lesson, manualized version of the *L2W* curriculum in the small randomized efficacy trial described in this article. AI teachers delivered each lesson over two 45-min regular classroom periods. The *L2W* lessons (see Table 1) incorporated culturally specific ways that UAI youth can use to resist substance offers, including distinct ways of employing the REAL strategies (Kulis & Brown, 2011; Kulis, Reeves et al., 2011; Okamoto, Hurdle, & Marsiglia, 2001).

The adapted *L2W* curriculum is strengths-based in design, engaging students in explorations of their heritage and integrating elements of AI culture that illustrate the curriculum's key components. Because UAI families have diverse tribal backgrounds, *L2W* identified shared features of AI culture like storytelling, which resonated across UAI communities (see Jumper-Reeves et al., 2014, for details). The curriculum integrates these shared intertribal cultural elements through scenarios, activities and Cultural Heritage Projects in each lesson. In Lesson 2, for example, youth use an interview guide to ask their grandparents about the most important things to learn about their traditions, values, ceremonies, and how their culture shapes who they are. We assessed the *L2W* curriculum by comparing changes in a range of outcomes for student participants in *L2W* to students who received the original *kiR* curriculum, by estimating effect sizes of the relative improvements in outcomes in *L2W*, and by describing lessons learned on the feasibility of implementing *L2W*.

Methods

Setting and Participants

The study site, in the Phoenix, Arizona metropolitan area, has the nation's third largest UAI community, with nearly 100,000 AI residents (US Census Bureau, 2010). The study's 107 participants were AI youth in the 7th or 8th grade who were enrolled in three urban middle schools in the fall of 2009 or 2010. These schools have a substantial number of AI students and offer voluntary academic and cultural enrichment programs specifically for AI youth during regular school hours, taught by AI teachers. In the study schools, youth of AI background accounted for 5–11% of all enrolled students. The research team randomized schools into intervention conditions by assigning them sequential numbers and using a random number table to select two that delivered the *L2W* curriculum and one that delivered the original *kiR* curriculum in existing AI academic enrichment classes. After randomization, the *L2W* and *kiR* schools had very similar ethnic/racial group breakdowns, nearly identical AI student populations (7% and 8%, respectively), and no significant differences in self-reported academic grades. Two successive cohorts of students participated at each school over the course of two academic years. Because AI students could participate in the enrichment program for multiple years, 11 study participants in the first cohort received the intervention a second time during the following year. We examined the survey responses of these students only during the first year they received the intervention. Their number was too small to investigate the impact of repeated doses of the prevention curricula.

Survey Administration and Human Subjects Protection

The research team followed human subjects protection policies of the university and the study schools to obtain active parental consent and student assent from all participants. After

training in a standard protocol, AI masters of social work graduate students on the research team administered the 50-min questionnaire in the academic enrichment program, after the teacher left the room. They informed students verbally and in writing that both the pretest and posttest questionnaires were part of a university research project, participation was voluntary, and answers would remain confidential. Students could choose to complete a self-administered questionnaire and sign the assent form, or return a blank questionnaire unobtrusively. No student declined to participate. Students completed a pretest questionnaire at the start of the academic year, before any lesson was delivered, and a posttest questionnaire one month after the last lesson, in the spring semester.

Curriculum Training and Delivery

Highly experienced curriculum trainers from the research team led a day-long teacher training in *kiR* or *L2W*. Over the next five months, the regular AI teachers in the academic enrichment program delivered the *L2W* and *kiR* lessons. Some lessons spanned multiple weekly classes of 45 min. Research team observers attended several lessons and rated the teachers on the quality of instruction and fidelity to the curriculum manuals. Instructional quality (organization, preparation, developmentally appropriate content, student participation, and positive student response) was scored on a scale from 1 (*low*) to 5 (*high*), and ranged from 4.0 to 4.8, indicating high quality on these components. Ratings on a scale from 1 (*not at all*) to 4 (*completely*) measured how faithfully the teachers followed the lesson plans, including the instructions, videos, practice, and homework. Mean fidelity scores ranged from 3.1 to 3.4, indicating that teachers “mostly” adhered to the curricula.

Participant Characteristics

A demographic profile of the sample appears in Table 2. Study respondents comprised a gender-balanced sample, predominantly (80%) aged 12 or 13 years. Half of the students lived with both parents, 40% with one parent (usually mothers), and 10% without a parent, usually with grandparents. Students generally were from lower income families and participated in the Federal school lunch program. Most students had AI mothers and fathers. Length of residence in the urban area varied, but most students had lived in the city for over 10 years. Students reported extensive connections to tribal communities. All but 6% said they belonged to one of 17 AI tribes or reservation communities, typically an Arizona-based tribe, with over half of Navaho/Diné, Apache, Hopi, or Tohono Oodham heritage. A large plurality visited a reservation at least yearly, and 40% made monthly or weekly visits. *L2W* and *kiR* respondents did not differ significantly from each other on any of these characteristics.

Outcome Measures

Study outcomes were measures of substance use, other risk behaviors, and an array of antecedents of substance use that the prevention curricula targeted. Table 3 details the source of the measures, question wording, and response options, and compares scale reliability in the study sample with that reported in the original source. The pretest and posttest contained identical questionnaire items measuring all outcomes. There were seven measures of the frequency and amount of recent (last 30 day) use of alcohol, cigarettes, marijuana and inhalants, employing developmentally appropriate questions for this age group as shown in

prior studies (Hansen & Graham, 1991; Hecht et al., 2003). We also calculated the mean for last 30 day frequency of five risk behaviors other than substance use (e.g., fighting, stealing, or carrying a weapon).

We examined key antecedents or predictors of youth substance use initiation, each measured as the scale mean of several component items: substance use intentions, permissive drug norms, vulnerability to drug offers, perceived harmlessness of substance use, positive substance use expectancies (perceived benefits), and exposure to substance use offers. These antecedents are important in assessing the impact of middle school prevention programs because most students have not yet initiated substance use but are entering a period where experimentation accelerates rapidly. We scored all measures of antecedents such that high values indicate stronger pro-drug orientations or exposure. We summed several additional questions on the strategies that students used to deal with offers of alcohol, cigarettes, and marijuana to produce measures of the frequency of use of each of the four REAL strategies: refuse, explain, avoid, and leave (Hecht et al., 2003).

We also examined three scales measuring AI cultural identification and engagement to assess whether the curriculum strengthened the students' connection to their heritage: (1) the overall strength of AI ethnic identity, modeled on Phinney's (1992) Multigroup Ethnic Identity Measure [MEIM]; (2) AI spirituality; and (3) engagement with AI cultural traditions, as measured by degree of involvement in AI ceremonies or practices.

Analysis Strategy

We first examined changes in outcomes from pretest to posttest with pairwise *t* tests, within intervention type (*L2W* or *kiR*), indicating the direction and statistical significance of changes. Second, we estimated relative intervention effect sizes (*L2W* vs. *kiR*) using Cohen's *d*, comparing mean changes in outcomes in the two interventions. Third, general linear models tested for differences in these two interventions using dummy variable contrasts of *L2W* versus *kiR* and controls for the outcome measured at the baseline pretest. Full-information maximum likelihood (FIML) estimation in Mplus 7.0 (Muthén & Muthén, 2012) accounted for attrition to the posttest (15%) and item missing data, and a robust maximum likelihood estimator (MLR) adjusted for any non-normalities in the distributions of outcomes.

Results

Table 4 presents means, standard deviations, and changes in means from pretest to posttest for all outcomes, separately by intervention group. It is notable that the direction of aggregate changes in both groups on all measures of substance use behaviors and antecedents was generally toward heavier substance use and stronger pro-drug attitudes and exposure, reflecting developmental changes over this period of early adolescence. Two of these changes attained ($p < .05$) or approached ($p < .10$) statistical significance among *L2W* participants, in opposite directions: marijuana use increased in frequency ($p = .06$) but agreement that substance use is harmless decreased ($p = .04$). In contrast, despite a smaller sample size, *kiR* participants reported increases in five substance use outcomes that reached

or neared statistical significance, including alcohol frequency ($p=.02$), cigarette frequency ($p=.01$) and amount ($p=.08$), and marijuana frequency ($p=.07$) and amount ($p=.07$).

Use of the four REAL strategies increased in mean frequency in both intervention groups, with the exception of declining use of the *Leave* strategy by *L2W* participants. However, only one change approached statistical significance—increased use of *Avoid* by *kiR* participants ($p=.06$). Means for all measures of cultural identification and engagement declined from pretest to posttest for both intervention groups; one of these—AI spirituality—dropped significantly in the *kiR* group ($p=.03$).

We also conducted direct tests of differences in outcomes between the two interventions through baseline-adjusted general linear models (see Table 5). Comparing *L2W* to *kiR*, intervention effects reached or neared statistical significance for four outcomes. Three showed relatively more positive changes in *L2W* than in *kiR*: cigarette frequency ($p=.06$), AI spirituality ($p=.03$), and AI cultural traditions ($p=.02$). The fourth one indicated that *kiR* students expanded their use of the *Leave* resistance strategy more than *L2W* students. The remaining outcomes of non-significant differences between *L2W* and *kiR* divided into two patterns according to consistencies in the direction of effects and effect sizes. Changes in *L2W* were relatively better than *kiR* on all measures of substance use and risk behaviors, their antecedents, and cultural identification. In contrast, use of all drug resistance strategies increased more for *kiR* than for *L2W* students. Estimated effect sizes were generally small for substance use antecedents and resistance strategies, approached medium size for most substance use behaviors, and ranged from small to large for cultural identification outcomes. We also assessed post hoc power analyses using G*Power. The average power for behavioral outcomes and resistance strategies was about .20, for antecedents about .13, and for cultural outcomes about .30. Based on these estimates, the respective required sample sizes to achieve statistically significant effects at $p < .05$ would have been about 350, 650 and 250, respectively.

Discussion

The main aims of the *Living in 2 Worlds* efficacy trial were to create, pilot, refine, and test a culturally adapted substance use prevention program designed specifically for UAI youth. The curriculum incorporated core components of efficacious substance use prevention programs but included modifications that addressed cultural and social influences on the substance use vulnerability and resilience of these youth found in prior research, including key family influences on substance use (Kulis & Brown, 2011; Kulis et al., 2006; Kulis, Reeves et al., 2011; Okamoto et al., 2004; Rayle et al., 2006).

In interpreting results it is important to consider that this efficacy trial tested the impact of *L2W* on substance use, drug resistance skills, and other outcomes compared to *keepin' it REAL*, rather than to a non-intervention control group. Considerable evidence demonstrates that *kiR* is efficacious with multi-cultural samples (Hecht et al., 2003; Kulis et al., 2005; Kulis, Nieri et al., 2007; Kulis, Yabiku et al., 2007; Marsiglia et al., 2011) as well as highly cost-effective (Miller & Hendrie, 2008). Organizations and schools in 48 states and several countries use *kiR*, including the D.A.R.E. program (Hecht, Colby, & Miller-Day, 2010;

Nordrum, 2014). Thus, *kiR* constitutes a very exacting standard for comparison when interpreting the magnitude, direction, statistical significance, and effect size of the *L2W* intervention effects from our small sample trial. Widely used benchmarks for assessing effect sizes (e.g., Cohen's *d* thresholds of .2 and .5 for medium and large effects) may be misleading when comparing two interventions (Lipsey et al., 2012). Any relative improvements in outcomes that the *L2W* intervention produces are effects above and beyond those already demonstrated in *kiR*.

In the key outcomes targeted directly by both the *L2W* and *kiR* interventions—substance use and its antecedents—only cigarette use showed significantly more positive changes for students who participated in *L2W* as compared to *kiR*. For other outcomes, the pattern of results was in a relatively more positive direction for *L2W* than for *kiR* students in regards to alcohol and marijuana use, as well as substance use antecedents that ranged across intentions, norms, expectancies, and vulnerability and exposure to drug offers. From pretest to posttest, aggregate changes in these outcomes in both intervention groups were in the direction of greater risk of substance use. The purpose of *L2W* and *kiR* is not to halt or reverse all adolescent substance use, but rather to help counter typical developmental substance use trajectories during adolescence. Substance use initiation accelerates rapidly in early adolescence until it peaks in the mid-20s in a similar developmental pattern across racial/ethnic groups (Chen & Jacobson, 2012; Stanley, Harness, Swaim, & Beauvais, 2014). Thus any positive effects of the *L2W* intervention would likely be relative, helping to delay rather than reverse the initiation of substance use, to impede progression to heavier use, and to slow the adoption of pro-substance use orientations. Although the increased effects of *L2W* compared to *kiR* reached statistical significance for only one of these outcomes, most effect sizes for substance use behaviors were in the realm of those achieved by *kiR* in other trials of that program ($d = .2$).

For another set of outcomes, use of the REAL drug resistance strategies, the direction of relative intervention effects was the opposite, with *kiR* students reporting more frequent use of resistance strategies than *L2W* students. For the *Leave* strategy, the difference between intervention groups reached statistical significance and approached a medium effect size. There are a number of reasons this pattern of results may have occurred. The *L2W* curriculum is richer than *kiR*. *L2W* incorporates explorations of cultural heritage along with drug resistance skills training, while *kiR* lessons focus more on the REAL strategies. Another difference is that *L2W* presented the REAL strategies in a more complex culturally-grounded manner. For example, the expanded *Avoid* strategy in *L2W* includes ways to evade the use of substances while remaining in the situation, such as by avoiding eye contact, re-directing the conversation, pretending not to hear a substance offer, and recommending an alternative prosocial activity. Another possible reason for more frequent use of the REAL strategies by *kiR* participants is that questionnaire items described the strategies simply to ensure they were comparable to those used in prior trials of *kiR*, without specific reference to the more culturally nuanced ways that *L2W* elaborated on these strategies.

A foundational assumption in the adaptation of the *L2W* curriculum is that helping UAI youth locate and connect with the cultural values of their heritage will increase resilience against substance use and promote overall wellbeing. Although the design and scale of this

study does not allow for a test of the mediating role of cultural engagement in preventing risk behaviors, it did provide evidence that the *L2W* curriculum helped to check the loss of connections to AI culture. Measures of AI cultural engagement declined among both intervention groups, but decreases in AI spirituality and involvement in AI cultural practices were significantly more modest among the *L2W* students, approaching a medium effect size. *L2W* may help counter conflicting bicultural influences in urban settings which can create a cultural shift toward the dominant culture and a progressive loss of connections to AI heritage (Walters, 1999; Walters et al., 2002).

Dissemination and Implementation Lessons Learned

The *L2W* trial demonstrated important feasibility challenges in implementing effective, targeted prevention programs for urban AI early adolescents, but also pointed to practical solutions and additional benefits beyond the key prevention objectives. Few urban schools have sufficient concentrations of urban AI students to allocate resources for targeted prevention efforts. Even among the small number of schools in this trial, the academic enrichment classes varied across schools in length and requirements for participation (e.g., maintenance of minimum school grades), complicating program delivery and retention. At the same time, the trial revealed that bringing urban AI students together introduced positive dynamics, such that it led to the discovery of other AI school peers and the rewards of dialogue for learning about cultural heritage and life skills.

L2W lessons are richer, longer and more numerous than those of *kiR*. The trial demonstrated that *L2W* requires more time than *kiR* for implementation, to complete cultural heritage projects, and to practice skills. In future implementations, it may be helpful to divide *L2W* into more lessons or pare the content to accommodate regular class periods. Non-school based venues for delivering *L2W* might be needed, especially in UAI communities where youth are scattered in very small groups across many schools. If delivered in other schools and communities, *L2W* requires careful training of implementers and attention to fidelity to retain the benefits of the original *kiR* core components and enhanced cultural grounding.

Limitations

The results from our study require careful interpretation because they come from a small, non-population-based sample in one metropolitan area of the Southwest. Although participants came from multiple school districts, our results are not generalizable to other UAI communities or the rest of the metropolitan area. Moreover, recruitment for the study may have introduced unknown selection biases because all participants enrolled voluntarily in a cultural and academic enrichment program for AI students, and participated in the program because their parents identified them as AI to the school. The sample may thus over-represent AI students from urban families that recognize and embrace their Native heritage, and those most interested in learning about that heritage in structured programs with other AI students. The small scale of the study limited our ability to detect statistically significant differences in outcomes from pretest to posttest and differences between intervention groups. Family-wise Type I errors may have occurred due to the large number of outcomes we examined. The small number of schools constrained an investigation of the

social contexts that may differ across urban AI communities. Possible contexts that may lead to differential prevention effects include the proportional representation of AI students in the school, neighborhood and city; the diversity of tribal backgrounds; and the physical proximity to tribal communities of origin. Therefore, more studies should be conducted with samples representing AI students, schools, and urban AI communities from all regions to verify our results.

Conclusions

This trial of the *L2W* substance use prevention program for UAI early adolescents provided indications of relative improvements, compared to an existing model program, in preventing cigarette use and maintaining connections to AI culture. Most differences in outcomes were non-significant in this small sample, but the direction of effects and estimated effect sizes for measures of substance use behaviors and antecedents suggested the possibility that *L2W* may be effective as a prevention tool in a larger trial. Programs such as *L2W* may be helpful not only in engaging youth with their heritage but also in realizing resulting health and wellbeing benefits. Recommended next steps to establish the efficacy and appropriateness of *L2W* across UAI communities are: conduct larger and more geographically diverse trials; provide comparisons to non-intervention control groups; use of more tailored measures of culturally influenced drug resistance skills; provide further refinements to the curriculum to increase the range of positive outcomes; and ensure the feasibility of dissemination and sustainability.

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Table 1

Living in 2 Worlds Lessons

<i>L2W Lesson Title</i>	<i>Content/Learning Objectives</i>	<i>Cultural Heritage Project (Intertribal Elements)</i>	<i>Associated <i>kiR</i> Lesson</i>
L1 Options & Choices	Youth learn about <i>L2W</i> and how to identify important factors when making a choice	Home & Reservation (home and place issues, sacred history, and traditional beliefs – supports common experience of separation and urban relocation)	L1 Options & Choices
L2 Living in 2 Worlds	Youth learn unique aspects of their culture & identify advantages of living in two worlds	My Clans/Bands (clans/bands, ancestry, sacred history and home – supports value of familial cooperation and interconnectivity)	none
L3 Beliefs, Norms, & Values	Youth identify and clarify their norms, beliefs and values, and how to behave in accordance with them	Grandparent Interview (respect for elders, sacred history, storytelling, ancestry – supports value for extended family structure and interconnectivity)	L8 Values & L9 Feelings
L4 Avoid	Youth learn how to <i>Avoid</i> substance use and risky situations	Ceremonies & Family Traditions (ancestry, ritual, respect, traditional beliefs & language – supports values of coexistence with nature, extended family structure)	L6 Avoid
L5 Risky Business	Youth identify how risk-taking can have harmful consequences and identify personal values for reducing it	Risky Business “Then & Now” (spirituality, ritual, respect, ancestry, traditional beliefs – supports values of coexistence with nature, noninterference)	L2 Risks
L6 Communicating Choices	Youth learn communication skills to express feelings and views assertively but respectfully, acknowledging differences with others	Roles in Communication: How My Family “Talks” (traditional beliefs & language, storytelling & respect – supports non-confrontational interaction and/or passivity)	L3 Communication & Conflict
L7 Refuse Respectfully	Youth learn to use the <i>Refuse</i> strategy verbally and non-verbally	Refuse Respectfully Comic Strip (home and place issues, ritual, traditional beliefs – supports use of humor as a strategy, subjective reasoning, visual learning, innate creativity)	L4 Refuse
L8 Storytelling	Youth learn how storytelling can be used as a protective factor in risky situations	Storytelling(ancestry, traditional language & beliefs, sacred history, respect – supports values of coexistence with nature, extended familial support structures, cooperation)	none
L9 Explain	Youth learn communication skills to <i>Explain</i> why they do not intend to engage in risky behaviors	My Own Explanation/Resistance Script, Story, Rap, Poem or Interview (traditional language & beliefs, sacred history, respect storytelling – supports communication preferences)	L5 Explain
L10 HLPNTWRKZ (Help Networks)	Youth identify friends, family, and others who can support them and learn how to ask for help	My Culture’s Role Models/Heroes (spirituality, sacred history, traditional beliefs, respect – supports value of extended family structures and interconnectivity)	L10 Support Networks
L11 Leave	Youth learn the <i>Leave</i> resistance strategy	My Goals (respect, traditional language & beliefs, ancestry, ritual, spirituality – supports values of time orientation, cooperation, extended family structures)	L7 Leave

L2W Lesson Title	Content/Learning Objectives	Cultural Heritage Project (Intertribal Elements)	Associated <i>kiR</i> Lesson
L12 My Place in Both Worlds	Youth identify strengths of AI culture and of being bicultural successfully	Who Am I? Cultural Heritage Notebook (home, sacred history, traditional beliefs, spirituality, ritual, respect – values of interconnectivity, extended family, time orientation, cooperation, co-existence with nature)	none

Table 2

Demographic Characteristics of Participants, by Intervention Condition

	<i>Living in 2 Worlds (n=85)</i>	<i>keepin' it REAL (n=22)</i>	Total (N=107)	Difference Test (L2W v. kiR)
Gender				
Female	50.6%	45.5%	49.5%	$\chi^2 = 0.2, 1 \text{ df}, p=.67$
Male	49.4%	54.5%	50.5%	
Living Arrangement				
Both Parents	50.6%	47.6%	50.0%	$\chi^2 = 3.6, 2 \text{ df}, p=.17$
Single Parent	37.0%	52.4%	40.2%	
Other Relative	12.3%	0.0%	9.8%	
School Lunch Program				
Free Lunch	63.3%	83.3%	67.0%	$\chi^2 = 2.9, 2 \text{ df}, p=.23$
Reduced Price Lunch	20.3%	5.6%	17.5%	
Neither	16.5%	11.1%	15.5%	
Parental Heritage				
Mother is AI	77.8%	85.7%	79.4%	$\chi^2 = 0.6, 1 \text{ df}, p=.42$
Father is AI	59.8%	71.4%	62.1%	
Urban Residence				
5 Years or Less	28.4%	23.8%	27.0%	$\chi^2 = 0.2, 2 \text{ df}, p=.91$
6–10 Years	18.5%	19.0%	18.6%	
> 10 Years	53.1%	57.1%	53.9%	
Tribal Affiliation				
Arizona Tribe	87.7%	95.5%	89.3%	$\chi^2 = 1.6, 2 \text{ df}, p=.46$
Non-Arizona Tribe	6.2%	0.0%	4.9%	
No Tribal Affiliation	6.2%	4.5%	5.8%	
Reservation Visits				
Weekly	26.2%	13.6%	23.6%	$\chi^2 = 2.8, 3 \text{ df}, p=.42$
Monthly	14.3%	22.7%	16.0%	
Yearly	39.3%	50.0%	41.5%	
Less than Yearly or Never	20.2%	13.6%	18.9%	
Age (Mean)	(12.5)	(12.4)	(12.4)	$t=0.46, 105 \text{ df}, p=.65$

Table 3

Outcome Measures

Outcome	Questions	Responses	Scale Reliability in Study Sample	Reference & Published Reliability
Alcohol Frequency Cigarette Frequency Marijuana Frequency Inhalants Frequency	(4 questions) - How many times in the last 30 days have you: drunk more than a sip of alcohol (beer, wine, liquor)? ...smoked cigarettes? ...smoked marijuana (pot, weed)? ...sniffed glue, spray cans, paint or other inhalants to get high?	1 to 7: None, 1–2 times, 3–5, 6–9, 10–19, 20–39, 40 or more times		Hansen & Graham (1991)
Alcohol Amount	(1 question) - How many drinks of alcohol have you had in the last 30 days?	1 to 7: none, 1, 2–3, 4–7, 8–15, 16–30, over 30		Hansen & Graham (1991)
Cigarette Amount	(1 question) - How many cigarettes have you smoked in the last 30 days?	1 to 7: none, a puff, 1, 2–3, 4–10, 11–20, > 20		Hansen & Graham (1991)
Marijuana Amount	(1 question) - How many hits of marijuana have you had in the last 30 days?	1 to 7: none, 1–2, 3–5, 6–9, 10–19, 20–39, 40+		Hansen & Graham (1991)
Other Risk Behaviors	(5 questions) - How often in the last 30 days have you: got into a physical fight? ...done something dangerous on a dare? ...skipped school? ...used or carried a weapon? ...stole something?	1 to 5: never, once or twice, a few times, at least once a week, almost daily	$\alpha = .83$	CDC (2015) <i>a</i> .
Substance Use Intentions	(3 questions) - If you had the chance this weekend, would you use: alcohol? ...cigarettes? ...marijuana?	1 to 4: definitely no, no, yes, definitely yes	$\alpha = .85$	Hecht et al. (2003) $\alpha = .82$
Permissive Drug Use Norms	(3 questions) - Is it OK for someone your age to: drink alcohol? ...smoke cigarettes? ...smoke marijuana?	1 to 4: definitely not OK, OK, not OK, definitely OK	$\alpha = .92$	Hecht et al. (2003) $\alpha = .86$
Vulnerability to Drug Offers	(3 questions) - Are you sure you would say NO if: ...a family member offered you alcohol? ...a close friend offered you marijuana? ...a kid at school offered you a cigarette?	1 to 4: very sure, sure, not sure, not at all sure	$\alpha = .89$	Hecht et al. (2003) $\alpha = .79$
Perceived Harmlessness of Substance Use	(3 questions) - How much do you think people risk harming themselves if they: smoke one or more packs of cigarettes a day? ...smoke marijuana regularly? ...drink one or two beers nearly every day? ...have 5 or more drinks of beer, liquor or wine in a row?	1 to 4: great risk, some risk, little risk, great risk	$\alpha = .90$	Arthur et al. (2002) $\alpha = .88$
Positive Substance Use Expectancies	(3 questions) - Do you agree or disagree? Drinking alcohol makes parties more fun. Smoking cigarettes makes people less nervous. Smoking marijuana makes it easier to be part of a group.	1 to 4: strongly disagree, disagree, agree, strongly agree	$\alpha = .84$	Hecht et al. (2003) $\alpha = .78$
Exposure to Substance Offers	(4 questions) - In the last 30 days, about how many times were you offered: Alcohol? ...Cigarettes or tobacco? ...Marijuana? ... Other drugs?	1 to 6: never, once, 2–3, 4–6, 7–10, over 10 times	$\alpha = .84$	Marsiglia et al. (2014) <i>a</i> .
Drug Resistance Strategies 12 items: four questions for each of three substances	(12 questions) - In the last 30 days, how often did you respond in the following ways when alcohol; ...cigarettes; ...marijuana was/were offered to you? Said 'No' without giving a reason why? [Refuse]; ...Gave an explanation or excuse to turn down the offer [Explain]; ... Avoided people or places because you might be offered (the substance) [Avoid]; ...Left the situation without accepting the offer [Leave]	0 to 3: never, once, twice, 3 or more times Summed across all three substances the range for each strategy is 0 to 9		Hecht et al. (2003)

Outcome	Questions	Responses	Scale Reliability in Study Sample	Reference & Published Reliability
American Indian (AI) Ethnic Identity	(11 questions) - I have tried to learn more about my AI background. I have often talked to other people about my AI background. I am happy to be AI. I feel like I really belong to an AI community. I am involved in AI customs, such as food, music or celebrations. I am active in organizations or social groups that include mostly AI. I have a clear sense of my AI background and what it means to me. I think about how my life will be affected because I am AI. I understand pretty well what it means to be AI. I feel strongly attached to my AI community. I feel good about my AI Indian background.	1 to 4: strongly disagree, disagree, agree, strongly agree	$\alpha = .90$	Phinney (1992) ^b $\alpha = .81$
American Indian Spirituality	(4 questions) - How involved are you in private AI spiritual activities? How important is it for you to follow traditional American Indian beliefs? Are spiritual values a part of your life? How important is being spiritual to you?	1 to 4: not at all, a little, some, a lot	$\alpha = .80$	Kulis, Hodge, Ayers, Brown & Marsiglia (2012) ^b $\alpha = .79$
American Indian Cultural Traditions	(10 questions) - How involved are you in these American Indian traditions? Memorials/feasts; Powwows/dances; Giveaways; Healing ceremonies; Sweats; Naming ceremonies; Talking circles; Spiritual running; Drumming groups; Sacred tobacco use	1 to 4: not at all, a little, some, a lot	$\alpha = .90$	Kulis, Wagaman, Tso, & Brown (2013) ^b $\alpha = .90$

^aNo reliability coefficient presented for scale in referenced article

^bScale has been used with AI youth

Table 4

Pretest to Posttest Changes in Outcomes, by Intervention Condition (*L2W* and *kiREAL*)

	<i>Living in 2 Worlds (n = 85)</i>						<i>keepin' it REAL (n = 22)</i>					
	<u>Pretest</u>			<u>Posttest</u>			<u>Pretest</u>			<u>Posttest</u>		
	<i>M</i>	<i>SD</i>	<i>t</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>M</i>	<i>SD</i>	<i>t</i>
<i>Risk Behaviors</i>												
Alcohol Frequency	1.4	1.1	1.8	1.6	1.6	0.34	1.55	1.0	0.4	1.7	1.2	0.70
Alcohol Amount	1.6	1.2	1.6	1.3	0.05	0.23	1.1	0.5	1.6	1.0	0.41	1.59
Cigarette Frequency	1.2	0.8	1.5	1.3	0.24	1.39	1.0	0.3	1.8	1.4	0.78	2.56*
Cigarette Amount	1.4	1.1	1.5	1.4	0.13	0.63	1.2	0.6	1.7	1.3	0.55	1.73†
Marijuana Frequency	1.5	1.3	2.0	1.9	0.47	1.87†	1.1	0.6	1.9	1.7	0.73	1.83†
Marijuana Amount	1.8	1.7	2.1	2.0	0.33	1.14	1.3	0.7	2.0	1.8	0.77	1.81†
Inhalants Frequency	1.3	1.0	1.2	0.6	-	-0.86	1.1	0.5	1.2	0.8	0.16	0.80
Other Risk Behaviors	1.4	0.7	1.5	0.7	0.02	0.18	1.3	0.5	1.4	0.7	0.12	0.65
<i>Pro-Substance Use</i>												
Intentions to Use	1.5	0.7	1.6	0.9	0.14	1.05	1.2	0.4	1.4	0.7	0.18	0.92
Permissive Drug Use Norms	1.3	0.5	1.5	0.8	0.13	1.16	1.2	0.4	1.3	0.7	0.06	0.32
Vulnerability to Drug Offers	2.0	1.1	2.0	1.2	0.00	0.01	1.8	1.1	1.9	1.2	0.15	0.40
Substance Use	2.5	1.1	2.1	1.3	-	-	2.1	1.1	2.2	1.1	0.05	0.14
Substance Use Expectancies	1.8	0.8	2.0	1.0	0.17	1.21	1.6	0.7	1.9	0.8	0.32	1.35
Exposure to Substance	1.7	1.2	1.9	1.4	0.19	0.94	1.2	0.6	1.6	1.1	0.39	1.44
<i>Drug Resistance Strategies</i>												
Refuse Strategy	1.6	2.1	1.9	2.6	0.34	0.93	0.9	1.7	1.8	2.6	0.91	1.36
Explain Strategy	1.5	2.2	1.6	2.1	0.13	0.39	0.9	1.7	1.6	2.5	0.65	1.00
Avoid Strategy	2.3	3.0	2.8	3.3	0.53	1.07	0.8	1.8	2.2	2.8	1.37	1.93†
Leave Strategy	1.6	2.4	1.6	2.3	-	-0.10	0.9	1.7	2.1	3.0	1.14	1.53
<i>Cultural Identification</i>												
AI Ethnic Identity	3.0	0.5	2.9	0.8	-	-0.85	3.2	0.5	2.9	0.7	-	-1.42
AI Spirituality	2.6	0.8	2.5	1.0	-	-0.30	3.0	0.6	2.4	0.8	-	-2.18*
AI Cultural Traditions	2.0	0.8	2.0	0.9	-	-0.12	2.1	0.8	1.7	0.9	-	-1.34

† *p* < .10.

.10' *d*
**
'50' *d*
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Table 5Comparative Intervention Effects (*L2W* versus *kiREAL*), Pretest to Posttest

	Estimate ^a	SE	Cohen's d	95% CI for d	Power ^b
<i>Substance Use Behaviors</i>					
Alcohol Frequency	-0.017	0.078	-0.270	(-0.929, 0.390)	0.201
Alcohol Amount	-0.082	0.103	-0.296	(-0.942, 0.350)	0.232
Cigarette Frequency	-0.194 [†]	0.103	-0.493	(-1.156, 0.169)	0.533
Cigarette Amount	-0.134	0.096	-0.335	(-0.999, 0.320)	0.284
Marijuana Frequency	-0.122	0.107	-0.166	(-0.825, 0.494)	0.106
Marijuana Amount	-0.111	0.100	-0.243	(-0.904, 0.418)	0.172
Inhalants Frequency	-0.164	0.111	-0.331	(-0.985, 0.322)	0.278
Other Risk Behaviors	-0.134	0.098	-0.140	(-0.796, 0.517)	0.089
<i>Pro-Substance Use Antecedents</i>					
Intentions to Use Substances	-0.055	0.081	-0.050	(-0.694, 0.595)	0.055
Permissive Drug Use Norms	-0.074	0.109	0.100	(-0.557, 0.757)	0.070
Vulnerability to Drug Offers	-0.073	0.131	-0.125	(-0.713, 0.462)	0.081
Perceived Substance Use					
Harmlessness	-0.083	0.084	-0.359	(-0.992, 0.274)	0.318
Positive Substance Use Expectancies	-0.130	0.095	-0.162	(-0.785, 0.461)	0.103
Exposure to Substance Offers	-0.047	0.082	-0.160	(-0.818, 0.498)	0.102
<i>Use of Drug Resistance Strategies</i>					
Refuse Strategy	-0.076	0.105	-0.242	(-0.905, 0.421)	0.171
Explain Strategy	-0.062	0.123	-0.238	(-0.900, 0.443)	0.167
Avoid Strategy	-0.027	0.098	-0.274	(-0.936, 0.387)	0.206
Leave Strategy	-0.266*	0.111	-0.494	(-0.494, 0.154)	0.534
<i>Cultural Identification</i>					
AI Ethnic Identity	0.060	0.090	0.226	(-0.429, 0.881)	0.155
AI Spirituality	0.171*	0.080	0.520	(-0.136, 1.176)	0.577
AI Cultural Traditions	0.201*	0.086	0.377	(-0.247, 1.002)	0.345

^aStandardized estimates from baseline adjusted general linear models using full information maximum likelihood estimation, *N*=107^bPower analyses were calculated using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009)[†]*p* < .10.**p* < .05.